REMARKS

The acceptance by the Examiner of the drawings filed December 2, 1999, is again noted with appreciation.

Claims 1 to 3, 5 to 12, and 14 remain in the application. The allowance of claims 8 to 11 and the indication that claims 6 and 7 are directed to allowable subject matter is noted with appreciation.

The disclosed and claimed invention is directed to time division duplex indoor wireless communication networks employing a frequency look-ahead, packet/slave scheduling scheme and master/slave link characterization using a link state history table in the master unit in order to account for channel and system characteristics. Indoor wireless networks based on standards such as the Bluetooth standard use frequency hopping to combat the problem of interference from sources such as microwave ovens and cordless telephones, which also use frequencies in the same band. In practical environments, in addition to active interfering sources, there can also be objects such as water fountains and racks of bottles with water content which absorb much of the radiation in the 2.45 GHz band and obstruct communication between master and slave units in the vicinity. Therefore, a master unit needs to detect such problems in communication and take necessary actions to prevent loss of packets during the periods of interference.

The invention provides a method of combating the problem of interference from external sources and shadowing objects in indoor pico-cellular wireless networks which utilizes frequency look-ahead and short-term history about channel state with reference to different mobile units within a pico-cell. The method monitors the states of master-slave wireless communication links through values recorded in link counters. Based on the recorded values, an appropriate slave is scheduled and the suitable packet size chosen to overcome the effect of interfering sources if any in the pico-cell.

The claimed invention comprises frequency look-ahead to know at any point of time the frequencies that will be used during the future time slots by the

master and slave units. A frequency selection unit (FSU) as shown in block diagram form in Figure 3 is used to find the current frequency on which to transmit or receive. The FSU receives address bits and clock bits at slot "*i*" and outputs an index to the frequency at slot "*i*". The FSU is basically a combinatorial logic unit comprising functions of addition, exclusive-OR, and permutation operations.

In the claimed invention, an additional FSU is used to find the frequencies corresponding to future time slots, as shown in block diagram form in Figure 4. The processor 41 in the master unit obtains the frequency corresponding to any time slot by providing as inputs to the additional FSU 42 the address bits and the appropriate clock bits. With this scheme, frequencies corresponding to next "*k*" time slots are obtained by the processor sequentially.

Claims 1 to 3, 5, 12, and 14 were rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,532,228 to Burgess et al., newly cited in this Office Action. The rejection is respectfully traversed for the reason that Burgess et al. neither shows nor suggests the claimed invention.

Burgess et al. discloses a receiver for receiving a radio packet transmitted at a transmission frequency. Reception circuitry is arranged to receive radio signals at a receiving frequency. The reception circuitry includes a phase locked loop arranged to maintain the receiving frequency substantially equal to the transmission frequency; a detector which detects within the received radio signals a pre-defined sequence identifying the beginning of a radio packet; and disabling circuitry which disables the phase locked loop after the receipt of the sequence of radio signals identifying the beginning of a radio packet.

The Burgess et al. patent is primarily aimed at a new receiver design with a phase locked loop disabling function to conserve power. In contrast, the claimed invention focuses on minimizing failure of communication during a time slot due to interference sources by judicious choice of frequency, packet-size and packet-recipient based on history of link states maintained in a set of counters. While both the Burgess et al. receiver and the claimed invention are applicable to indoor

wireless communication systems that are based on the Bluetooth standard, their objectives and methods of achieving them are completely different.

Regarding claim 1, contrary to the Examiner's position, there is no second frequency selection unit (FSU) in the Burgess et al. patent. The Examiner cites col. 9, lines 1 to 27, of the Burgess et al. patent as describing this feature. However, there are only two frequency dividers (504, 516 in Figure 5) that are used to control the frequency to be used during a current time slot. The passage cited by the Examiner pertains to the control of those frequency dividers by the frequency controller 518. In the claimed invention, the second frequency selection unit is not a frequency divider but, rather, a unit which computes as per the frequency hopping sequence of the Bluetooth standard, the frequencies that should be used in the future time slots.

Claim 1 specifically recites "a master unit having a processor and a first frequency selection unit for finding a current frequency on which to transmit and receive during a current time slot and at least *a second frequency selection unit* interfaced with said processor *to look ahead at frequencies that are to be used in future time slots*" (emphasis added). Burgess et al. does not show, much less contemplate, such a structure.

Regarding claims 2 and 3, the second FSU in the claimed invention is used to determine the possible frequencies to be used in future time slots according to predetermined standards, in addition to the first FSU which is used to fined the frequency to be used during the current time slot. The logic units implied in Burgess et al. are required to perform frequency hop selection as per predetermined standards, but the claimed invention introduces a second FSU to look ahead for frequencies to be used as per the frequency hopping sequence of the network without affecting the performance of the necessarily required first FSU.

Claim 3 specifically recites "the processor in the master unit interfaced to the second frequency selection unit cooperate such that *a frequency corresponding to a future time slot* is obtained by the processor by providing binary information

about a pico-cell related address bits and clock bits corresponding to the time slot" (emphasis added). This is not shown or suggested by Burgess et al.

Regarding claim 5, there are no counters in Burgess et al. that are used to realize the functionality of link state counters C(i,j) that are used in the claimed invention. The three counters in Burgess et al. – inquiry counter 62, hold counter 64, and page scan counter 66 – are just timing counters used to provide control signals to perform appropriate actions. None of these counters is in any way used to record the count of the number of failed communication attempts indicating the link state with respect to the communication frequencies used during different time slots. The functions of the link state counters in the claimed invention and the counters used in Burgess et al. are altogether different and unconnected in any way. Moreover, in the preferred embodiment invention, there are $i \times j = 553$ link state counters that are used to record the link state for each of the 79 frequencies used in the Bluetooth standard and each of up to 7 slave units in a pico-cell. See Table 1 on page 8 of the specification.

Claim 5 specifically recites "said master unit having a plurality of link state counters C(i, j), wherein the condition of wireless links between the master unit and a slave unit *are recorded in link state counters* provided one for each frequency of communication f_i between the master and the slave 'i'" (emphasis added). This is not shown or suggested by Burgess et al.

Regarding claim 12, no where in Burgess et al. is there a mention of second level frequency look ahead as performed in the claimed invention. Moreover, there is no functionality involved in Burgess et al. to determine the next slave unit to be chosen and the packet-size to be used for communication. This is a clear differentiating feature of the claimed invention as compared to Burgess et al.

Claim 12 specifically recites "a master unit and a plurality of slave units, wherein

(a) a second level frequency look-ahead is performed by the master unit even before a packet from an addressed slave unit is received, and

(b) *the second level look-ahead is performed by the master unit to determine*

the slave units and packet sizes to be used next corresponding to the different sizes of packet that might be transmitted by an addressed slave unit" (emphasis added). This is not disclosed or suggested by Burgess et al.

Regarding claim 14, no where in Burgess et al. is there a use of goodness counters to maintain expected stats of wireless links with reference to interference. The Burgess et al. receiver does not address the subject of assessing the goodness of wireless links based on the experienced state of links during the receding communication time slots.

Claim 14 specifically recites "the master unit maintains an expected state of wireless links with reference to interference by using *a table of counters whose values indicate goodness of links*" (emphasis added). Burgess et al. does not show or suggest this feature.

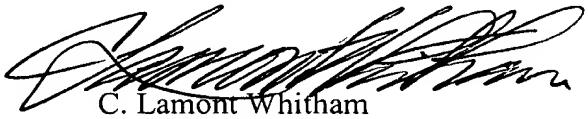
Thus, each of the claims 1 to 3, 5, 12, and 14 recites distinct differentiating features not shown or taught by Burgess et al. These unique features of the claimed invention clearly are not anticipated by Burgess et al.

In view of the foregoing, it is respectfully requested that the application be reconsidered, that claims 1 to 3, 5, 12, and 14 be allowed together with allowed claims 8 and 11 and claims 6 and 7 indicated as being drawn to allowable subject matter, and that the application be passed to issue.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

A provisional petition is hereby made for any extension of time necessary for the continued pendency during the life of this application. Please charge any fees for such provisional petition and any deficiencies in fees and credit any overpayment of fees to Attorney's Deposit Account No. 50-2041.

Respectfully submitted,



C. Lamont Whitham
Reg. No. 22,424

Whitham, Curtis & Christofferson, P.C.
11491 Sunset Hills Road, Suite 340
Reston, VA 20190
(703) 787-9400
Customer Number 30743

Fax. (703) 787-7557